

Application No. 09/704,684
Amendment Dated: May 7, 2004
Reply to Office Action dated February 12, 2004

Amendment to the Claims:

The listing of claims will replace all prior version, and listings, of the claims in the application:

Listing of Claims:**1. (Currently Amended)**

A method for scheduling packets for transmission over a forward link in a wireless communication system, comprising:

- (i) determining, on a per-packet basis, a wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal;
- (ii) receiving a reported channel condition for a forward link from the terminal;
- (iii) determining a link mode for transmission to the terminal according to the reported channel condition; and
- (iv) scheduling each of the plurality of packets in order of its respective wireless quality of service condition, and at the determined link mode, for transmission in a physical layer frame.

2. (Original)

The method of claim 1, wherein the determination of the wireless quality of service condition includes assigning a packet tag to each of the plurality of packets.

3. (Original)

The method of claim 2, wherein the packet tag includes a start time and a finish time.

4. (Original)

The method of claim 3, wherein scheduling includes determining a deadline for each of the plurality of packets as a function of their respective start times and a current system time.

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5. (Original)

The method of claim 4, wherein the scheduling includes scheduling the plurality of packets in order of their respective deadlines.

6. (Original)

The method of claim 1, wherein further packets are scheduled for transmission to other terminals.

7. (Original)

The method of claim 6, wherein the scheduling includes determining which of the terminal and the other terminals has a best reported channel condition.

8. (Original)

The method of claim 6, wherein the scheduling includes scheduling packets destined to the determined terminal before scheduling packets to a remaining terminal.

9. (Currently Amended)

A scheduler for scheduling packets for forward link transmission in a wireless communication network, comprising:

a packet tag computation unit for determining, on a per-packet basis, a wireless quality of service condition for each of a plurality of packets awaiting transmission to a terminal;

a link mode determination unit for receiving a reported channel condition for a forward link from the terminal, and for determining a link mode for transmission to the terminal according to the reported channel condition; and

a scheduling unit for scheduling each of the plurality of packets in order of its respective wireless quality of service condition, and at the determined link mode, for transmission in a physical layer frame.

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10. (Original)

The scheduler of claim 9, wherein the packet tag computation unit determines a start time and a finish time for each of the plurality of packets, the start time and finish time being functions of the respective packet delay bound and an arrive time for each of the plurality of packets.

11. (Original)

The scheduler of claim 10, wherein the scheduling unit determines a deadline for each of the plurality of packets as a function of its respective start time and a current system time.

12. (Original)

The scheduler of claim 9, wherein the link mode determination unit receives a plurality of reported channel conditions for a plurality of terminals.

13. (Original)

The scheduler of claim 12, wherein the scheduling unit considers the plurality of reported channel conditions.

14. (Currently Amended)

A wireless access network, comprising:

- a radio transceiver for sending a physical layer frame to a terminal, and
- a scheduler for scheduling packets for transmission to the terminal, the scheduler having a packet tag computation unit for determining, on a per-packet basis, a wireless quality of service condition for each of a plurality of packets awaiting transmission to the terminal; a link mode determination unit for receiving a reported channel condition for a forward link from the terminal, and for determining a link mode for transmission to the terminal according to the reported channel condition; and a scheduling unit for scheduling each of the plurality of packets in order of its respective wireless quality of service condition, and at the determined link mode, for transmission

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in the physical layer frame.

15. (Original)

The wireless access network according to claim 14, the radio transceiver is included in a base station.

16. (New)

The method of claim 4, wherein

the packet tag is defined to be $P_{i,k}$ where i represents the number of queues and k represents number of packets,

an arrive time is defined to be $t_{i,k}^a$ and is the current system time when the packet enters a queue,

the finish time is defined to be $t_{i,k}^f$ and is equal to $t_{i,k}^a + D$ where D is the packet delay bound,

the start time is defined to be $t_{i,k}^s$ and is equal to $t_{i,k}^f - D_{i,k}^{ret} - D_{i,k}^{frag}$ where $D_{i,k}^{ret}$ is an estimated delay budget for retransmission for packets that can be retransmitted and $D_{i,k}^{frag}$ is the estimated delay budget for fragmentation, and

the deadline for each of the plurality of packets is defined to be $t_{i,k}^d$ and is equal to the current system time t minus the start time $t_{i,k}^s$.

17. (New)

The scheduler of claim 11, wherein the packet tag computation unit determines a packet tag

the packet tag is defined to be $P_{i,k}$ where i represents the number of queues and k represents number of packets,

an arrive time is defined to be $t_{i,k}^a$ and is the current system time when the packet enters a queue,

the finish time is defined to be $t_{i,k}^f$ and is equal to $t_{i,k}^a + D$ where D is the packet delay bound,

the start time is defined to be $t_{i,k}^s$ and is equal to $t_{i,k}^f - D_{i,k}^{ret} - D_{i,k}^{frag}$ where $D_{i,k}^{ret}$

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is an estimated delay budget for retransmission for packets that can be retransmitted and $D_{i,k}^{\text{frag}}$ is the estimated delay budget for fragmentation, and the deadline for each of the plurality of packets is defined to be $t_{i,k}^d$ and is equal to the current system time t minus the start time $t_{i,k}^s$.
